

Important facts about water well construction

If you are planning to have a water well bored, drilled or dug on your property, there are some important facts you should know. Ontario has a regulation under the Ontario Water Resources Act that sets out requirements for water wells. It requires that all well contractors and well technicians in the province be licenced, and it sets minimum construction standards.

Anyone engaged in the business of constructing water wells must be licenced by the province and be in possession of a valid contractor's licence.

The licence requires that the contractor be insured against liability claims, employ only licensed well technicians, and comply with all requirements of the Act and regulation.

A well technician's licence, issued by the province, is required for anyone working on well construction. The class of licence depends on the type of equipment the well technician operates (e.g. Class 1 - drilling, Class 2 - digging and boring and Class 3 - special). All persons installing pumps in wells must be provincially licenced Class 4 well technicians.

For your protection, you should ask to see the licence of your well contractor and well technician before work begins.

Construction requirements

There are a number of detailed requirements pertaining to well construction in the regulation. They cover such things as casing, grouting and sealing, and testing of the well.

Some of these requirements relate directly to the consumer. For example, the contractor must notify the well owner if the well is not in a sand-free state. The well contractor must provide the owner with a one-litre sample of well water for visual examination, and measure the well depth in the presence of the owner.

The well contractor is required to pump test a new well for at least one hour and to measure and record on a Water Well Record the rate at which water is withdrawn from the well and the water levels in the well during pumping or recovery after pumping. The contractor will estimate and report the yield of the well and recommend a pump setting.

Within two weeks of completion of the well, the well contractor must deliver to the owner a copy of the Water Well Record, which is the official document filed with the Ministry of the

Environment giving the well's location, and details about construction.

The well contractor is responsible for all work and costs associated with the prevention of any uncontrolled flow from a well and/or the abandonment of a flowing well in accordance with the regulation, unless a written contract with the owner expressly releases the well contractor from responsibility for costs. In any case, completion of the work by the well contractor is mandatory.

Here are some of the other construction requirements:

- A well must be at least 15 metres from any source of pollution if the casing is watertight to a depth of at least six metres. It must be at least 30 metres away if the casing is not watertight to a depth less than six metres.
- A well must be constructed so that surface drainage will not pond in the vicinity of the well.
- During construction, steps must be taken to protect the well against the entry of surface water and foreign material.
- A new well must be chlorinated to a minimum residual concentration of 250 milligrams of chlorine per litre of water. This concentration must be maintained for a minimum of 12 hours.
- A well must be constructed in such a way that there is no break-out of flowing water from around the well bore or an adjacent property. A device is required on the well casing to permit stoppage or regulation of flow from the well casing.
- All casing materials must be new and the top of the casing must be a minimum of 30 cm above the ground surface or floor of a wellpit. Casing in a drilled well must be a minimum of six metres in length unless the only useful aquifer of water-bearing zone is shallower.

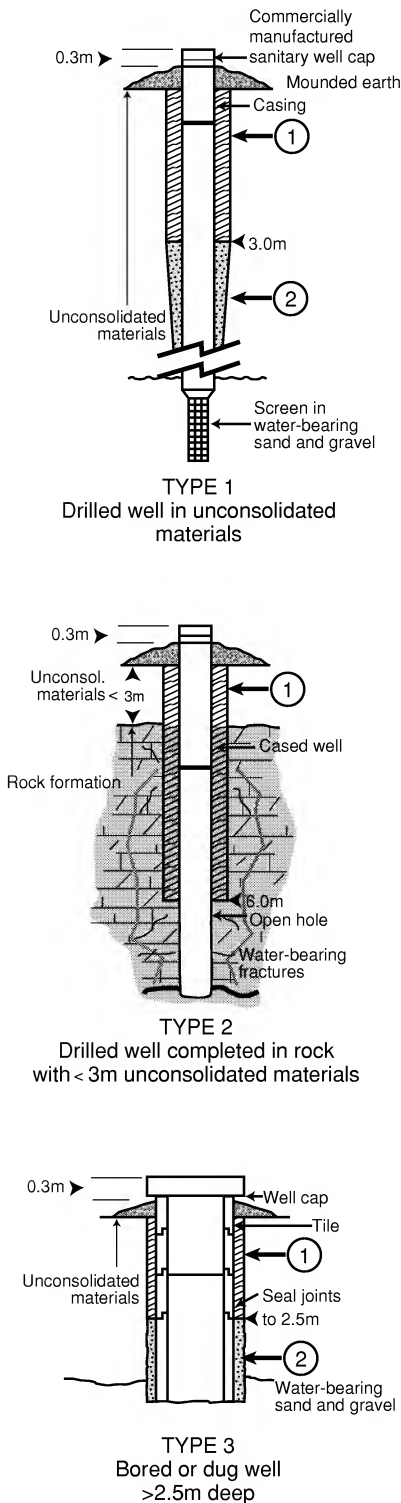


FIGURE 1

Construction requirements for some typical well types

- ① = Formation seal in annular space
- ② = Formation stabilizer in annular space

Well contamination

One of the common causes of well contamination is failure to seal properly the annular space (see figure 1) which is the space between the well casing and the hole in the ground.

There are a variety of materials that can be used for sealing this space, such as cement grout, concrete, or bentonite. You should ask your contractor how he intends to seal the well and what is the best material for your local conditions.

The pump connection also requires special care to ensure that it is watertight if the connection is made through the casing below the ground surface. The method of connecting may vary from a commercially manufactured pitless adaptor (drilled well) to the use of durable sealing materials (bored/dug well). Grouting material in the excavated annulus should extend half a metre into the trench excavation. Where a pump connection is made through the top of a watertight casing in a drilled well, a commercial sanitary well seal is required.

Most properly sealed wells require ventilation to allow air into the well casing for proper operation of the well and pump. The regulation specifies standards for the vent pipe.

It is important to ensure that wells which emit natural gas are vented to the outside of buildings to avoid the risk of explosion and fire.

Maintenance

Once the well is constructed, it is the well-owner's responsibility to maintain it in a manner that will prevent the entry of surface water or other foreign materials that are likely to contaminate the well and the aquifer.

Abandoning a well

The regulation also covers procedures for abandoning a well. New wells must be sealed if they are dry, and older wells if they are not going to be used anymore. Wells that produce unpotable salty, sulphurous or mineralized water must be abandoned.

Wells may also have to be abandoned on the order of the Ministry of the Environment if it is determined that natural gas poses a potential hazard or if the well construction standards have not been followed.

Abandoned wells are required to be plugged with concrete or other suitable materials. In special cases, such as in deep or flowing wells, an experienced well contractor should be retained.

Additional information sources

There are some additional ministry references you may wish to read. You may obtain a copy of the Regulation 903 itself. The Ministry of the Environment also has fact sheets entitled *Protection of Water Quality in Drilled Wells, Bored and Dug Wells* and *Recommended Methods for Plugging Abandoned Water Wells*.

For further information about wells contact your nearest Ministry of the Environment office as listed in the blue pages of your telephone directory. Or call the ministry's public information centre at 1-800-565-4923. In Toronto call 416-325-4000. The ministry's Web site is at www.ene.gov.on.ca.